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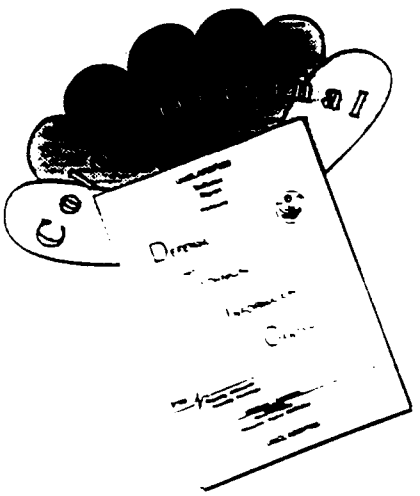
HYDROGRAPHIC SERVICE ANNUAL REPORT 1992 - 1993

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HYDROGRAPHIC SERVICE

Royal Australian Navy

ANNUAL REPORT 1992 - 1993

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Foreword by the Hydrographer



Commodore Leech was appointed head of the RAN Hydrographic Service in November 1990. A career naval officer, he has completed 25 years of naval service, ten of those in the United Kingdom. Recent senior appointments have included Director Hydrographic Office, Deputy Director Hydrographic Development and Commanding Officer HMAS MORESBY.

It is a pleasure to present the Annual Report of the Royal Australian Navy's Hydrographic Service. The Report describes the activities and achievements of the Service for the period 1 July 1992 to 30 June 1993.

Notable features of the period included:

- A continued steady rate of progress achieved in the surveying and charting of the Australian coast, in which HMAS MORESBY also steamed her one millionth mile;
- The Hydrographic Office Detached Survey Unit completing the survey of the offshore approaches to Casey Station in Antarctica;
- The Laser Airborne Depth Sounder Unit entering operational service with the RAN;
- Continued development and testing of the Electronic Chart Display and Information System (ECDIS), including an afloat demonstration;
- Parliamentary approval being given for the relocation of the Hydrographic Office to Wollongong, NSW;
- A marked decline in chart production caused by workforce changes as a result of the impending relocation;
- Good progress on the implementation of Naval Quality Management principles, with reviews into chart production and office communications;
- Greater public interest in the environmental protection benefits of the Program;
- Continuing efforts to source external funding; and
- Greater participation in international activity, especially as a leader in ECDIS technology.

I would also like to make special mention of the transfer of Program responsibility for the sub-components of Oceanographic Data Acquisition and Environmental Services. In order to provide more integrated and operationally focused Meteorological and Oceanographic (METOC) Services, on 30 June 1993 these areas transferred from the Hydrographic Service to the Maritime Operational Activity component of the Combat Forces sub-program. The METOC Services have made great strides in Fleet support services in recent years, and this transfer will ensure continued and improved relevance in the future. This separation will mark the end of an association with the Hydrographic Service which commenced in 1980 for the uniformed element of METOC Services, and in 1964 for the civilian element.

J.W. Leech
Commodore, RAN

Statement of Corporate Strategy

The Hydrographic Service supports the Royal Australian Navy, the Federal Government and the international maritime community as a national centre of excellence for all hydrographic products, data and issues relating to maritime safety and safe navigation in the Australian area of charting responsibility.

The RAN Hydrographic Service is the Commonwealth agency responsible for the publication of nautical charts and other information required for the safe navigation of ships in Australian waters. The Service also provides oceanographic and meteorological information and services to support operations of the RAN. The work of the Hydrographic Service was commenced by the Royal Navy in 1795, and was taken over by the Commonwealth of Australia in 1920.

The Service has five corporate objectives:

- **To meet the ADF requirement for geographic and environmental information so that maritime forces may be deployed and operated to the optimum at both the strategic and operational level of war.**
- **To provide as a community service, information, services and products to support safe navigation of all vessels in the Australian area of charting responsibility, to meet the requirements of domestic and international law, to support maritime administration and economic development, and for protection of the marine environment.**
- **To be custodian of the national data bases of hydrographic information.**
- **To advise the Federal Government and international maritime organisations on national hydrographic issues.**
- **To conduct its activities as a professional organisation which seeks excellence and values the contributions of its members.**

The core elements of the program are national and defence hydrography, together with the defence operational applications of oceanography and marine meteorology described collectively as the Geographic and Environmental Support Component 215000 of the Navy's Maritime Operations sub-program 210000.

The component program is implemented through the five sub-components of:

- **Hydrographic Survey** **215010**
- ***Oceanographic Data Acquisition*** **215020**
- **Navigation Services** **215030**
- **Environmental Services** **215040**
- ***Co-ordination and Development*** **215050**

GEOGRAPHIC AND ENVIRONMENTAL SUPPORT

Component 215000

Manager: Hydrographer RAN

REPORTS

1. HYDROGRAPHIC SURVEY



Manager: Director Hydrographic Operations

Captain Willis joined the RAN in 1967 and undertook specialist training in hydrographic surveying in 1975. He holds the degrees of Bachelor of Surveying with First Class Honours and Master of Management Economics from UNSW, and is a graduate of the RAN Staff College. He has commanded the landing ship HMAS SALAMAUA and the surveying ships HMAS FLINDERS AND MORESBY. He assumed the duties of Director Hydrographic Operations on promotion to Captain in November 1990.

Role

The acquisition and assessment of hydrographic data from field activities of the Marine Science Force and from other agencies.

Activities

Hydrographic Office Operations and Surveys element.
Hydrographic Ships and Survey units.

Objectives

Achievement of 10,000 square nautical miles of survey per annum in the 50-500 metre depth band, and 4,000 square nautical miles of survey per annum in the 0-50 metre depth band.

Performance Indicators

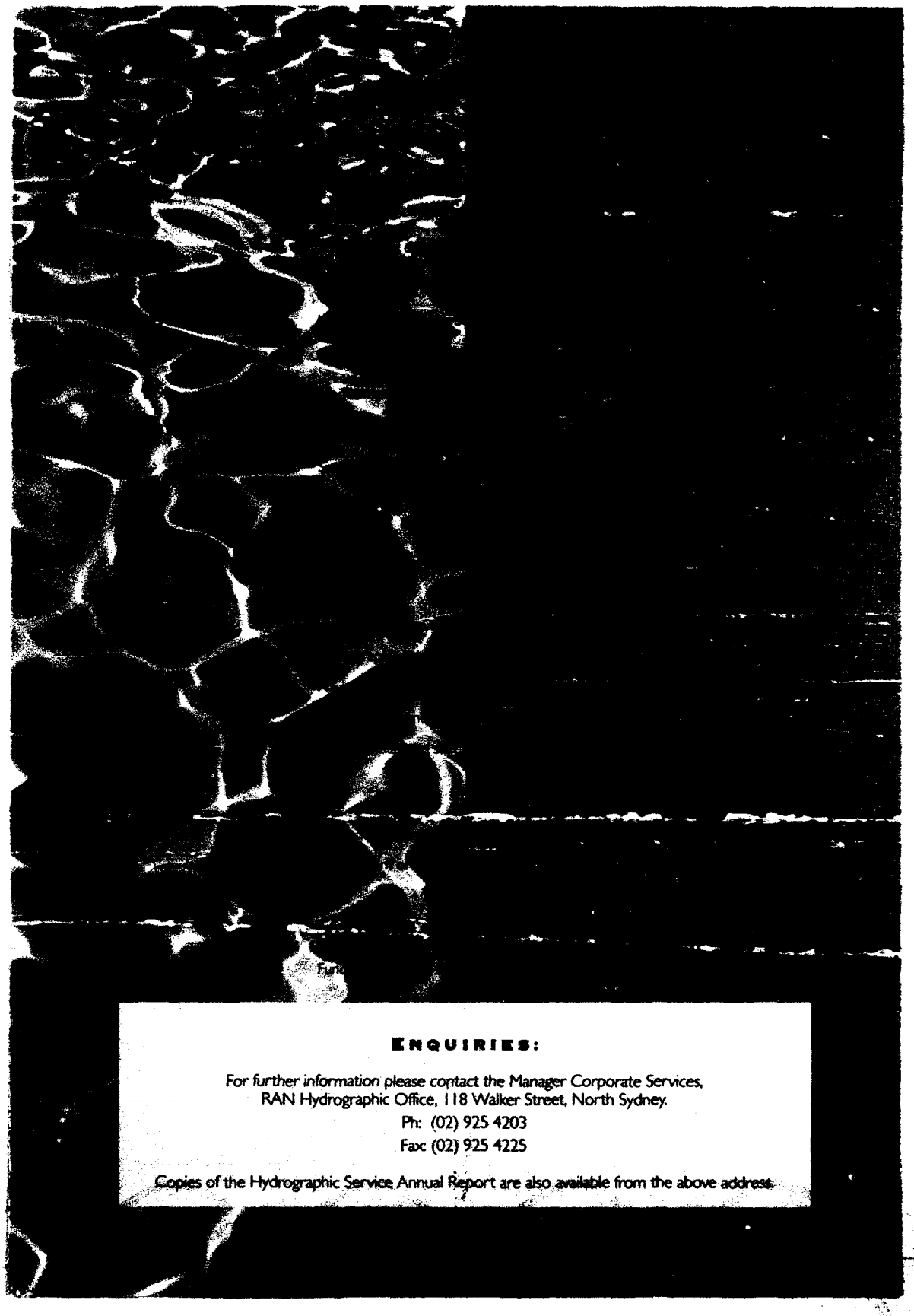
The rate of effort stated in the objectives is set to achieve a full survey of priority areas in the next 20 years. The priority areas are to the north of Australia and off PNG. The sub-component is therefore evaluated in terms of square nautical miles of survey to specification per annum.

HYDROGRAPHIC SURVEY

The objective of this sub-component is to carry out hydrographic surveys in accordance with the HYDROSCHEME. This plan has now been modified to form the basis for the Fleet Activity Schedule. HYDROSCHEME has a time horizon of two years and is updated annually. With an endorsed HYDROSCHEME, the Hydrographic Office manages the planning and tasking of surveys and performs the final quality checks before each survey is approved for charting action.

Major activities during the year have been:

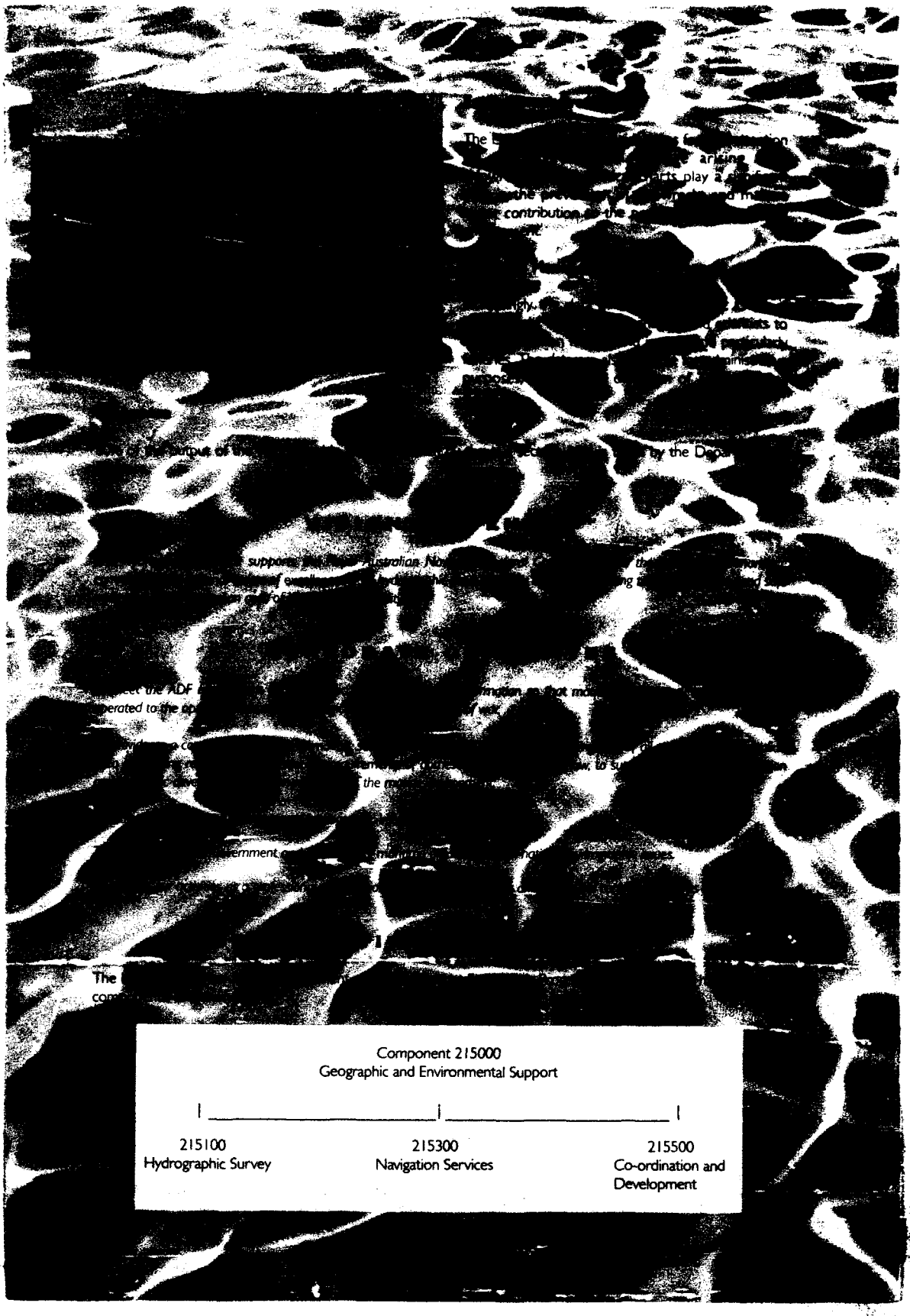
- Examination of HYDROSCHEME.
- Negotiation of a three year operational support contract with BHP Engineering Pty Ltd for the operation of the Laser Airborne Depth Sounder (LADS).
- Operational testing of LADS.
- Quality management initiatives, in particular examination of survey quality assurance procedures.



ENQUIRIES:

For further information please contact the Manager Corporate Services,
RAN Hydrographic Office, 118 Walker Street, North Sydney.
Ph: (02) 925 4203
Fax (02) 925 4225

Copies of the Hydrographic Service Annual Report are also available from the above address.



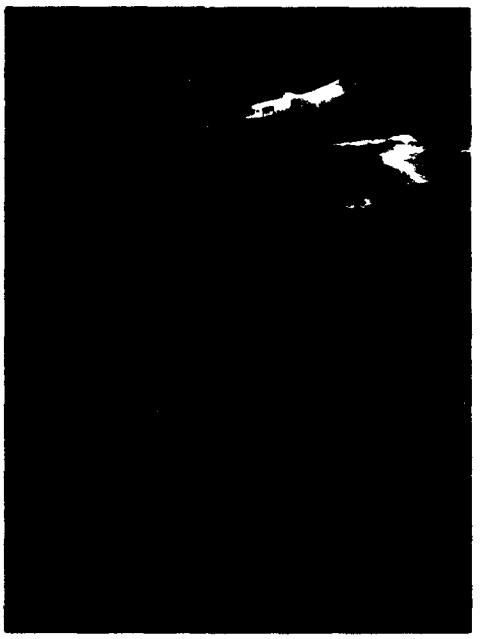
Component 215000
Geographic and Environmental Support

215100
Hydrographic Survey

215300
Navigation Services

215500
Co-ordination and
Development





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eries of 400 charts and publishes about 12 new charts and
sold to the public each year, and 30,000 are issued to the

harts in the national chart series are modern charts in
at. The remainder are old imperial charts which do not
n specifications, and some of which are not sufficiently
satellite derived navigation.

art coverage of the coasts of Australia and Papua New
es a chart series numbering 700 charts. Achievement of
in 20 years requires production rates to increase to 25
per year. This will be achieved over a period of years
technology and increases in staff.

s of output in this sub-component will change from a
chart) product focus to provision of a multiple of civil
products and services from a digital base. New civil
services will also support science, administration and
agement and development.

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INITIATIVES

Major current initiatives of the Hydrographic Service include:

Resources

Source external funding to meet requirements for digital products and services.

Increase civil staff levels to raise rates of production.

Investigate economies of commercial support for hydrographic survey.

Improve use of resources through Naval Quality Management (NQM).

Information Technology

Develop a digital database and data management system for hydrographic information.

Develop a digital chart data base for use in Electronic Chart Display and Information Systems and other applications.

Continued involvement in the development and validation of international standards for hydrographic surveys and charting technologies.

Services

Publish a national series of Sailing Directions.

Increase the rate of chart production to improve availability of a modern chart coverage.

Human Resources

Revise Hydrographic Service structure and personnel skills to better reflect the needs of the time.

Review arrangements for training, education and career development.

Use skills of personnel to better effect through NQM.

SURVEY OPERATIONS

During the latter half of 1992 HMAS MORESBY was engaged in survey operations in Arnhem Land. The Ship's Survey Motor Boats (SMB) operated close inshore from temporary camps completing the first modern surveys of Cadell and Stretton straits adjacent Elcho Island and a number of useful anchorages. In October 1992 MORESBY steamed her one millionth mile, the first RAN unit to achieve this milestone. In early 1993, she was employed primarily in an oceanographic role off the North West Coast while the SMB's were detached to Darwin Naval Base to conduct surveys near the Port of Darwin.

HMAS FLINDERS and her SMB sounded 14,065 line miles during the year, equating to an area sounded of 2,633 square nautical miles. Time away from base port was 148 days. In late 1992 FLINDERS surveyed the Swain, Saumarez and Frederick Reefs and a 120 mile length of the proposed outer reef Tanker Route. In January 1993 she conducted a survey in the Gulf of Papua. The aim of this survey was to improve chart coverage in the poorly surveyed waters at the head of the Gulf, an area of increasing commercial activity. Survey operations concluded in July, with the completion of a survey of a deep draught shipping route between Flora Reef and Diane Bank.

HMA Ships MERMAID and PALUMA have undertaken four surveys during the period. A total of 205 days were spent deployed away from Cairns in the year. The ships have completed HI 179 Castlereagh Bay, HI 156 Great North East Channel and HI 192 Bunker Reef to Fairway Channel.

HMA Ships SHEPPARTON and BENALLA completed surveys in Halifax Bay off Townsville, and Laser Airborne Depth Sounder (LADS) trials in the Dunk Island and Townsville areas. The latter operation assisted in successful completion of pre-commissioning trials for LADS. In early 1993, both ships examined a new deeper draught alternative route to the present Great North East Channel, an important survey with economic and environmental protection benefits. During the year, SHEPPARTON and BENALLA were at sea for 165 days.

The Laser Airborne Depth Sounder Unit entered operational service on execution of the Operations Support Contract with BHP Engineering Pty Ltd on 22 February 1993. LADS commenced its first mission, HI 185 Flinders Passage, operating from RAAF Base Townsville in March. LADS moved to Cairns in June 1993 and continued operations in the Flinders Passage area. Refinement of processing software and algorithms continues at the LADS Project Office in Adelaide. Progress in procedures and operations is being directed towards formal acceptance into Naval service within the next year.

The Hydrographic Office Detached Survey Unit (HODSU) participated in Operation Beachcomber from July to September 1992, conducting surveys for amphibious operations. At the completion of the field component of the operation, OIC HODSU and resources of the Hydrographic Unit HMAS CAIRNS conducted a reconnaissance survey over a three day period of Swallows Landing in Trinity Inlet, Cairns. The 1992-93 Antarctic deployment completed the offshore approaches to Casey Station commenced during the summer of 1990-91.

TIDAL SECTION

The Section's work includes production of the Australian National Tide Tables (as well as Solomon and Vanuatu National Tide Tables), and support for cartographic work, survey operations and special projects. Through the auspices of the Defence Cooperation Program the Section has been involved in the evaluation and supply of low cost digital tide gauges for PNG, Solomon Islands and Vanuatu. A close liaison is maintained with the National Tidal Facility in Adelaide. A feature of this year's work has been a continuation of the process of adjusting chart datum and datum for predictions to Lowest Astronomical Tide.

DEFENCE CO-OPERATION PROGRAM

Under the auspices of the Defence Co-operation Program, Hydrographic Advisers have been seconded to the Governments of the Solomon Islands and Vanuatu. Both Advisers are Chief Petty Officer Marine Science. The Solomon Islands Hydrographic Unit was established in 1980 and the Vanuatu Hydrographic Unit in 1987. Both Units are to be reviewed in 1993 to assess the continuing need for the adviser program.

ASSESSMENT AGAINST PERFORMANCE INDICATORS

The total area surveyed by the Hydrographic Service during 1992-93 was 7,000 square miles. The achievement figure was affected by major planned maintenance periods for all units.

This year an additional performance indicator, the ratio of miles sounded to miles steamed, has been examined. This is considered to better reflect unit achievements and is not affected by location or intensity of survey. The respective ratios were:

- MORESBY 26 %
- FLINDERS 50%
- MERMAID 18%
- PALUMA 20%
- SHEPPARTON 18%
- BENALLA 18%

2. NAVIGATION SERVICES

Manager: Director Hydrographic Operations

Role

The provision of marine navigation information, and the delivery of customer services and products related to safety of navigation at sea.

Activities

Nautical Charting

Navigational Services

Information Services

Chart Distribution

Objectives

To provide timely delivery of services and products to the Australian Defence Force (ADF) and maritime community.

To produce sufficient products and services to a standard that will meet Australia's needs for safe navigation in Australian and Papua New Guinea waters.

Performance Indicators

The extent to which products and services are supplied to satisfy the ADF and maritime community's navigation needs.

The extent to which products and services cover the navigable waters around Australia and Papua New Guinea, in a timely and accurate manner.

NAUTICAL CHARTING

This element is responsible for the compilation and digital production processing of new nautical charts, the revision of published charts through new editions, the maintenance of existing published charts through minor revision, maintaining the ongoing chart reprinting program and maintaining the national digital chart database.

Objectives are to produce and revise nautical charts in accordance with the National Charting Program to approved international standards. The target set in the Charting Program has not been achieved during this year. The official announcement of the intended Hydrographic Office relocation to Wollongong in 1994 has resulted in the loss of ten staff members to date. The staff recruitment freeze and increased attention to personnel development through external courses has also markedly reduced the production efficiency.

A production system to replace the AUTOCHART 'E' series platform, installed in 1979, was implemented in July 1992. The new 'A' series is now the main processor for the Autochart system and is supported by modern interface back-lit digitising tables and dual screen interactive graphics terminals. A majority of production software has been transferred from the 'E' series platform to the 'A' series platform. Introduction of this advanced facility has necessitated a retraining program for chart compiling staff which has temporarily contributed to further loss of production time.

Twenty eight charts were identified for production during the year; all have been developed to advanced stages although only 11 finished products were achieved. All defence priority charting requisitions were achieved. With limited staff resources the planned chart reprinting program was maintained with a total of 257 charts being processed. Continued support has been given to Notices to Mariners through digital compilation production of block corrective chartlets.

The introduction of blue tint emphasising areas of shallow water, has been included on a number of formerly published British Admiralty charts of Australian waters. These charts, previously issued devoid of blue colour, have since been taken into the Australian chart series by arrangement. This added colour dimension has noticeably improved sales of these products and provides the chart user with a much clearer guide to likely areas of danger.

The Chart Information System was introduced to administer information related to the paper chart. Significant quantities of information have to be entered into the system from manual records. Initially, the focus has been on published chart details, Notice to Mariners promulgated notices from 1993, printed chart stock analysis and the chart reprinting program. The databases are expected to be completed in the next financial year.

NAVIGATION SERVICES

The progress towards a national set of Sailing Directions remains an outstanding matter in the transfer of charting responsibility from the UK Government to the Australian Government. Draft sailing directions text has been provided for the four relevant Hydrographic Instructions issued to units of the Marine Science Force.

Fifteen Returns of Survey have been examined during the quality control procedure, and relevant detail of an urgent nature has been published in Notices to Mariners. Information on the area's output for the reporting period is at Annex D.

The section continues to respond to queries from authorities and the public relating to the origin and historical significance of the names of various coastal and maritime features. The 800 items researched in 1992-93 have been added to the database.

Proposals for new names of undersea features have been forwarded to the International Hydrographic Organisation (IHO) for international recognition and adoption into IHO/IOC Special Publication BP0008. Forty nine Australian names were adopted in 1992-93. The Hydrographic Service was represented at the meeting of the Committee for Geographical Names in Australia and the United Group of Experts on Geographical Names, Division of Asia, South-East and Pacific South-West Division held in October 1992.

INFORMATION SERVICES

During the year, the Library has undergone a number of changes to make the collection more accessible. The effect of these changes is reflected in an increase of 72 percent in the borrowing rate, and requests for interlibrary loans have risen 272 percent over the year. A Defence Information Services Network (DISNET) terminal, providing on-line access to the combined catalogue of all Australian defence libraries as well as providing a gateway to other Defence databases, was installed during the year.

The Records Section of the Information Services element received some 712 items of hydrographic information during the year from RAN survey vessels and other sources (acknowledgments are made at Annex E). This incoming information affected approximately 184 charts.

CHART DISTRIBUTION

The total quantity of charts sold during the year increased by 17 percent over the previous year, whereas the quantity of Australian charts sold rose by 18 percent. Sales Revenues increased by an unprecedented 30 percent. These sales increases were the result of the inclusion of the British Admiralty modified reproductions into the Australian chart series, and improved sales due to the Free In Store freight service introduced in 1991-92 taking full effect. Sales volume and revenue figures are provided at Annex A.

The chart agency network was expanded by the appointment of two agents in Darwin and Nhulunbuy. Selected chart agents in Adelaide, Perth and Darwin were visited during May 1993.

ASSESSMENT AGAINST PERFORMANCE INDICATORS

Six new standard navigation charts and eleven new editions of former published charts were produced during the year. Additionally in support of the ADF, nine new charts and a miscellaneous chart product were completed and issued.

The chart reprinting program was satisfactorily maintained in accordance with planned objectives, resulting in the provision of updated stock (147 charts), to local and overseas Chart Agents.

The weekly Notice to Mariners correction service continued to be supplied in a timely manner and was cartographically supported by the production of twenty-two block chartlets for general issue to the maritime community.

Existing chart stock held in-house was continuously corrected before issue by overprinting methods arranged through contract services; 110 charts were updated through this scheme in order to minimise user correction being undertaken at point of sale. The Chart Information System database has been continuously updated and contributes to prompt delivery of products to Chart Agent's requisitions.

3. OCEANOGRAPHIC DATA ACQUISITION

Manager: Director Oceanography and Meteorology



Commander David Knight joined the RAN in 1972 as an Instructor Officer. Apart from several postings in the training and education area, most of Commander Knight's Navy career has been as a Meteorology and Oceanography (METOC) specialist. Postings in the METOC field include to the Naval Weather and Oceanography Centre at HMAS ALBATROSS in the mid to late 1970s and again as OIC in the late 1980s, to HMAS MELBOURNE in the early 198Cs, on exchange with the Royal Navy also in the early 1980s, to the then Australian Joint Maritime Warfare Centre in the mid 1980s, and finally as the Director of Oceanography and Meteorology (DOM) for the past two years.

Role

Planning, tasking, and maintaining professional standards for oceanographic data collection carried out by assigned RAN units of the Marine Science Force, other RAN units and leased assets.

Co-ordination of bids for ship time for oceanographic research and data collection.

Relevant data acquisition and quality control.

Activities

Oceanographic Survey Plans.

Maritime Environmental Data Acquisition and Quality Control.

Oceanographic Survey Operations.

Objectives

The establishment of a baseline of 16 qualified environmental data parameters, by systematic survey and data acquisition, in Australia's area of Direct Military Interest. In particular, in accordance with Defence priorities (CCC 1992) the establishment of this baseline for the Northern Maritime Approaches within a 30 year time frame.

Performance Indicators

For systematic survey, in terms of square nautical miles achieved, and quantities of individual parameters acquired, to specification per annum.

For data acquisition, in terms of quantities of individual parameters acquired to specification per annum.

OCEANOGRAPHIC DATA ACQUISITION

Without a dedicated oceanographic survey ship or funds to lease a suitable vessel, progress of systematic effort continues to be constrained. Limited data was gathered by tasking HMAS MORESBY for physical oceanographic survey in Australia's Northern Approaches over a 70 day period in 1993. Efforts continued to increase the data collected by both Major and Minor Fleet units with relatively inexpensive expendable bathythermograph (XBT) systems. Significant quantities of data continued to be acquired from outside agencies and managed in the Maritime Environmental Data Base (MEDB).

OCEANOGRAPHIC SURVEY

HMAS MORESBY was tasked during the period 14 April to 30 June 1992 to undertake the RAN's first systematic oceanographic data gathering survey. Operating in waters between NW Cape and Melville Island the aims of the survey were:

a. 164 water column observations for temperature, conductivity and salinity at selected locations;

b. Measurements of the vertical structure of the Leeuwin Current;

c. Measurements of acoustic reflectivity from the seabed at selected sites; and

d. Secchi disk observations off Darwin and Port Hedland for correlation with satellite derived turbidity measurements.

Although MORESBY is not ideally suited to oceanographic surveying, the cruise was generally successful with most of the aims met and, equally importantly, valuable experience was gained for future Naval and commercial oceanographic surveying activities.

OCEANOGRAPHIC SURVEY PLANS

As a further means of collecting oceanographic data, particularly in the data sparse Northern Maritime Approaches, a Minor Equipment Proposal has been staffed for the fitting of HMA Ships TOBRUK, SUCCESS WESTRALIA and PROTECTOR, the Fremantle Class Patrol Boats and the Survey Motor Launches with a digital expendable bathythermograph system. Installation is expected to be completed by the end of FY 1993/94. Additionally, plans are underway to direct Major Fleet Units to collect XBT data, using the Mk-12 system installed in FY 1992/93, whilst transiting data sparse and strategically important areas.

MARITIME ENVIRONMENTAL DATA ACQUISITION AND QUALITY CONTROL

Bathythermal Data

The introduction of the Mk12 Digital Bathythermograph Recorder into Fleet Units during FY 1991/92 has improved both the quality of the data and the ease with which it can be managed. There is no longer a requirement to manually digitise the XBT observation before it is entered into the Marine Environmental Data Base. During the year a number of modifications were proposed to improve the effectiveness of the Mk12 software. The modifications, implemented by the Naval Weather and Oceanography Centre (NWOC) personnel, have assisted in reducing data loses and improving the quality of data available for input into the Tactical Environmental Support System (TESS).

The Australian Oceanographic Data Centre (AODC) continued to receive digital XBT observations from Fleet and analogue XBT traces from the Royal New Zealand Navy. The analogue traces continue to be forwarded to the US National Oceanographic Data Centre for digitisation. Analogue XBT traces were also received from the Royal Malaysian Navy. This data is part of the RAN/RMN co-operative program in oceanography and will possibly develop into a regular exchange activity.

Marine Environmental Database (MEDB)

A wide range of data was acquired by AODC over the reporting period. A detailed list is given at Annex E. This data has generally come via the United States National Oceanographic Data Centre (US NODC) and the co-located World Data Centre 'A' (Oceanography). The main data set consisted of

approximately 150,000 Mechanical Bathythermograph observations collected by research agencies from what was the USSR. Approximately a third of this data lies within the ADF's Area of Oceanographic Interest. Figure 1 shows the existing distribution of ocean thermal data (XBT) obtained from the US NODC and stored within the MEDB.

The development of a major data acquisition program has continued to be handicapped due to a lack of resources. A knowledge of potential data sources is gradually being developed as a result of contact with external agencies. Considerable background work was undertaken to identify foreign sourced data sets so that they could be acquired once the HydroComp oceanographic data management system was accepted in July 1993.

HydroComp Computer System

Final acceptance testing for HydroComp commenced in early April 1993 and a considerable effort was put in by all AODC staff to develop and run a wide range of tests to determine the compliance of the system to the original specifications. The system was finally accepted on 21 May 1993.

One HydroComp network is used as the development system and also has connections to the outside world via the Australian Academic Research Network (AARNet) which in turn provides access to INTERNET, a global communication network. The second HydroComp network is used for operational purposes and provides AODC's main data base capabilities. One component yet to be completed is the quality control module. The CSIRO Division of Oceanography is currently developing a quality control system for ocean thermal data and will provide the AODC with a copy of their software once it is operational. AODC personnel have assisted CSIRO with aspects of the software development and have undergone training with the pre-operational software.

International Activities

The AODC, together with the Bureau of Meteorology continues to operate the Integrated Global Ocean Services System (IGOSS) Specialised Oceanographic Centre (SOC). A number of statistics are obtained through the SOC regarding the transmission of real-time ocean thermal data on the World Meteorological Organisation's Global Telecommunications System (GTS). A lack of resources has hindered the development of any additional capabilities in the AODC's IGOSS activities.

The AODC has continued its participation in aspects of the data management component of the World Ocean Circulation Experiment (WOCE).

The RAN, through AODC, has continued to provide 2,000 XBT probes annually to CSIRO for use in their Ship of Opportunity Program (SOOP) as part of supporting the WOCE activity. SOOP consists of merchant vessels travelling on regular routes through areas of oceanographic significance. The value of the data resulting from this is much greater than data collected on a random basis.

The Head, Science and Oceanography represented the Hydrographer at the 14th Session of the Inter-governmental Oceanographic Commission's (IOC) Committee on International Oceanographic Data and Information Exchange (IODE) held in Paris during December 1992. The Committee made a significant recommendation which resulted in the establishment of the Global Data Archaeology Project, aimed at recovering the large quantities of relatively old data residing in research institutions around the world of value for climate change research. Efforts to undertake a similar activity in the Australian region have been restricted by a lack of resources.

AODC has continued its participation in the Global Temperature and Salinity Pilot Project (GTSPP) as a member of the GTSPP Steering Committee. Data collected by Australian ships, including RAN vessels, is available through GTSPP and monthly data sets are acquired electronically by AODC through INTERNET.

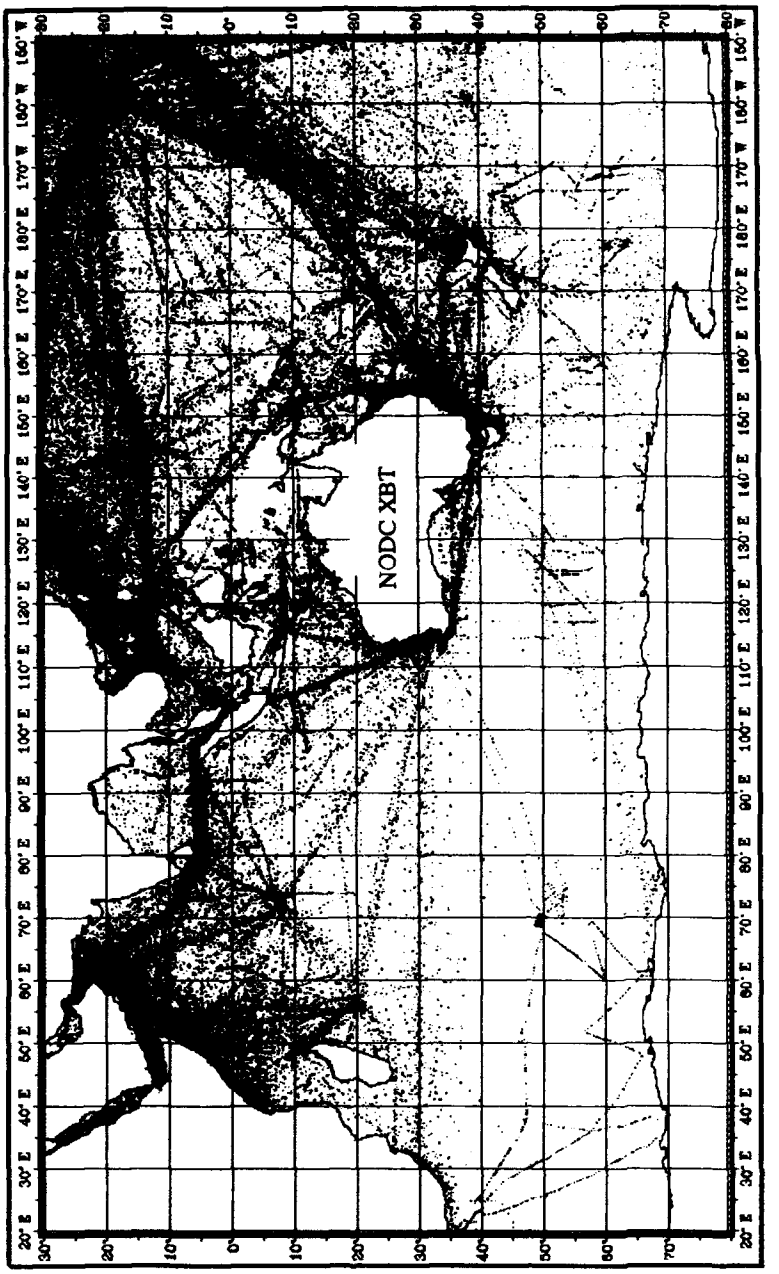


Figure 1. Ocean Thermal Data Coverage

ASSESSMENT AGAINST PERFORMANCE INDICATORS

For the first time results have been achieved in systematic oceanographic survey activities. 144 temperature and salinity versus depth profiles were gathered over approximately 200 000 square nautical miles of ocean. Also gathered as background tasks during MORESBY's survey were 114 Secchi Disk Observations, 239 bioluminescence observations, and 27 seabed samples.

The quantity of data acquired through national and international exchange during the year has seen the temperature and salinity databases increase by approximately 12%. In FY 1991/92 the quantities of data within the Area Of Oceanographic Interest was a little over 500,000 observations. This number has increased to over 560,000.

4. ENVIRONMENTAL SERVICES

Manager: Director Oceanography and Meteorology

Role

Standard Meteorological and Oceanographic (METOC) products and services in support of maritime operations.

METOC product revision to reflect user requirements.

Non standard products and services to meet special fleet and other national and international METOC requirements.

Archival and retrieval services.

Objectives

The provision of maritime environmental products and services to support the ADF's maritime environmental needs to meet national and international obligations.

Activities

Australian Oceanographic Data Centre.

Naval Weather and Oceanography Centre.

Performance Indicators

The percentage of METOC products provided to those requested.

The percentage of METOC products delivered on time.

The degree that METOC products satisfy user requirements, in relation to accuracy and operational relevance.

ENVIRONMENTAL SERVICES

In late 1992, Maritime Command approved an initiative to provide more integrated and operationally focused METOC Services. This initiative resulted in the Directorate of Oceanography and Meteorology and the AODC moving into the Maritime Headquarters (MHQ) Annex, Potts Point, in March 1993. A further relocation of the maritime support elements of the Naval Weather and Oceanography Centre (NWOC) to MHQ is planned for the end of 1993. At this time the Fleet Weather and Oceanography Centre will be created in MHQ, with the Applied METOC Centre being located with AODC in the MHQ Annex. A small METOC cell will remain at HMAS ALBATROSS to provide support to aviation operations.

INTERNATIONAL AFFAIRS

In November 1992 Commander Knight and Mr B.J. Searle (Head AODC) visited Malaysia for discussions on oceanographic data gathering and management, as part of the Malaysian Australian Joint Defence Program (MAJDP) - Oceanography Project. Subsequent personnel exchanges between the two Navies gave rise to a joint RMN - RAN produced Environmental Brief for Exercise STARFISH 93, which was issued to Exercise participants.

In June 1993 Commander Knight visited US Naval Oceanography Command centres in Hawaii, Washington DC and Mississippi, as well as Canadian Forces METOC centres in Victoria, British Colombia. The purpose of these visits was to improve co-operation and exchange of oceanographic information.

AUSTRALIAN OCEANOGRAPHIC DATA CENTRE

The AODC is responsible for providing maritime environmental support to the RAN, by supplying oceanographic data, analysed data and information and consultancy services. Marine environmental data and information is continuously acquired through the Data Acquisition and Quality Control program and is added to the Navy's Marine Environmental Database.

As Australia's national oceanographic data centre, the AODC is also responsible for the management and dissemination of physical oceanographic data. AODC supports the civilian marine science community and the general public, as well as meeting Australia's international obligations in oceanographic data management and exchange. AODC participates in a number of international and national marine scientific and data management activities which, among other things, contributes to the world climate research program.

There have been some significant changes and achievements for the AODC during FY 1992/93. The most important of these was the splitting of the METOC Services (including AODC) from the Hydrographic Service to be located closer to the main Defence client group at MHQ. The physical move from North Sydney to MHQ occurred on 15th March 1993 although Command and Control remained with the Hydrographer until the end of June 1993. This relocation has ended an association with the Hydrographic Service of some 29 years, since the creation of AODC in 1964. As a result of these changes the Head of AODC has replaced the Hydrographer as the National Representative for IGOSS and the National Coordinator for IODE.

In conjunction with the move to MHQ, the AODC underwent a successful internal restructuring. The restructuring was aimed at optimising the expertise within AODC and providing a more balanced management framework, including the devolution of responsibilities in line with Program Management and Budgeting objectives. The restructuring saw the creation of four groups, each with a group manager and clearly defined roles and responsibilities:

- Data Acquisition, Management and Quality Control;
- Data Collection;
- Products and Services; and
- Information Technology.

AODC has continued to consolidate its activities over the reporting period, with emphasis on more effectively meeting user needs. The production of the Environmental Brief has been streamlined and altered to provide a greater emphasis on the tactical use of the environment rather than a simple description of the expected conditions.

The demands for AODC products continues to grow, particularly Environmental Briefs for fleet deployments. Annex B details some of the more significant efforts. Due to the large number of reports produced this year and the loss of key personnel, it was not possible to allocate any resources to the compilation of the Regional Environmental Briefs. Their status remains unchanged.

In addition to the consultations conducted under the terms of the MAJDP, the AODC also provided consultancy to various defence projects including the Collins Submarine and the Mine Warfare Systems Centre. Discussions have also been held with MHQ regarding the management of amphibious operations information resulting from Operation Beachcomber.

NAVAL WEATHER AND OCEANOGRAPHY CENTRE

The Naval Weather and Oceanography Centre (NWOC) comprises three separate sections:

- the Meteorological and Oceanographic Office;
- the Applied Oceanographic Centre; and
- the RAN School of Meteorology.

The objective of the NWOC is to provide timely, accurate and operationally useful, METOC products, services and training to the ADF maritime community to assist in operational safety and to allow tactical exploitation of the above and below water environments.

In September 1992 the Seaman Category Rationalisation Study Team recommended that the Meteorology, Radar Plotter, Mine Warfare and Underwater Control Categories amalgamate to form the new Combat Systems Operator (CSO) Category. Consequently, the MET Category will disband early in FY 1993/94.

On 3 December 1992, the Maritime Commander approved the relocation of the maritime forecasting component of NWOC to Maritime Headquarters, Sydney, under the name of the Fleet Weather and Oceanography Centre (FWOC). This move is scheduled to occur early in 1994. An FWOC detachment will remain at the RAN Air Station, Nowra to provide local aviation support.

The level of routine output from the Centre was marginally lower when compared with the previous year, however support for RAN exercises has been more substantial and comprehensive. Demand for supplementary data support for the Tactical Environmental Support System (TESS) has continued at a high level.

In the interests of aviation safety, a digital airfield wind and pressure system was installed in the Met Office in August 1992. These instruments will also provide the necessary sensors for an Automatic Weather Station, due to commence operation in September 1993. The station will routinely issue automated weather observations into the National Meteorological Network resulting in substantial manpower savings.

Towards the end of the FY, primarily as a result of a contract with the Special Services Unit of the Bureau of Meteorology (BOM), the OIC of the Applied Oceanography Centre assisted in the development of oceanographic analysis software which has allowed for full automation of the weekly sea surface temperature charts of the East Australian and West Australian Exercise Areas.

RAN School of Meteorology (RANSOM)

As of 30 June 1993, the RANSOM ceased to exist, with many of its training obligations being assumed by the Applied METOC Centre. During the reporting period the key activity of RANSOM was to provide training in the military aspects of Meteorology and Oceanography for graduates of the BOM Forecasters' Course, with the Military Meteorology and Oceanography Course. Basic training for RAN Meteorological Observers and advanced meteorological category training was discontinued in December. A variety of specialist training was provided by the School, in the form of courses conducted for Small Ship's Flight Commanders and Junior Officers Under Training.

Applied Oceanography Centre (AOC)

Further software developments on TESS have seen the introduction into the fleet of TESS Version 1.1, the first major upgrade to the system. TESS continuation training was conducted in all major fleet units and initial training was also included in courses conducted by the Principal Warfare Officer and RAN Surface Warfare Schools. System manuals have been upgraded and development of a manual on the tactical applications of the TESS outputs commenced. Other training commitments of the AOC reduced with the re-introduction of the METOC billet in HMAS WATSON.

The real-time Sea Surface Temperature access system developed jointly by the AOC and the BOM was expanded to include satellite imagery collected by earth stations in Perth and Darwin. The extended coverage from the three station system now covers the eastern Indian Ocean and north to the South China Sea.

The AOC provided substantial input to the Generalised Environmental Prediction System (GEMS) developed by the BOM Special Services Unit and provided under contract to the NWOC. With this system the NWOC should have the tools to provide atmospheric and oceanographic forecasts out to five days for any area on the globe. The system is currently undergoing evaluation by the AOC prior to being handed over to the NWOC for operational use.

Planning for the next generation TESS commenced during the year and a Naval Staff Proposal approved for TESS II. The Minor Item Submission will be progressed early in the 1993-94 period. Several software packages able to be used in future TESS Version I upgrades but written primarily for TESS II were progressed during the year.

A proposal by the OIC AOC to determine turbidity from the Advanced Very High Resolution Radiometer (AVHRR) sensor in the NOAA series of weather satellites was followed up by the LADS project and a study carried out by CSIRO on the feasibility of developing a national database from archived images. A less accurate method of determining areas of high turbidity in real time, using imagery accessed from the BOM via MCIDAS, was also developed by the AOC.

ASSESSMENT AGAINST PERFORMANCE INDICATORS

An improvement in the cost effectiveness of producing environmental briefs has arisen from a better focus within the AODC on customer requirements and the introduction of new technology. AODC has therefore been able to meet and satisfy an increased number of requests. Support provided to the national and international civil community has also improved, particularly because of access to the AARNet communication system.

NWOC remained flexible in its response to requests for new products, and introduced a number of new and modified products and services. In the short term the distribution of Fleet forecasts and supplementary data was less than efficient, however, in the medium term this will improve significantly with the commissioning of the FWOC in early 1994. Various customer surveys were undertaken by NWOC during the year. In general, these reflected that a very good service has been provided to local customers, and a satisfactory, but improving, service has been received by Fleet units.

Excellent results were achieved by the AOC in the development of new METOC products. At the end of the period many of these products were undergoing evaluation prior to becoming operational. The level of use and understanding of products developed earlier is only satisfactory. This is being addressed through better documentation and the development and implementation of training courses for all levels of users.

5. CO-ORDINATION AND DEVELOPMENT

Manager: Director Co-ordination and Development



Ken Burrows first joined the Hydrographic Office as a cartographer in the late 1950s. He compiled many of the more complex charts around Australia and was responsible for introducing computers into hydrography in the mid 1970s. He was also largely responsible for the successful concept implemented as AUTOCHART, the chart production system still in use today. His ideas on hydrographic information, and initiatives for progressing the development of an electronic chart display and information system, have resulted in Australia being a world leader in the development of electronic charting. In 1993 Ken Burrows was awarded an O.A.M. for his services to marine cartography.

Role

Component wide aspects of planning, resourcing and co-ordination of hydrographic, surveying and cartographic operations and information management. Servicing and promoting the national activities of the Component.

Activities

Hydrographic Development.
Branch Development.
National and International Affairs.
Corporate Development.

Objectives

Supply the long-term planning and co-ordination of resources for tasks necessary to meet strategic guidance and national responsibilities.

Promote the Hydrographer's national and international role in hydrography.

Provide development and investigation services to meet specific program requirements with minimum disruption to operational areas.

Performance Indicators

The number of development initiatives successfully implemented.

The ability to meet international commitments affecting the national role of providing maritime geographic and environmental information.

The degree to which essential planning and project tasks can be performed without impinging on resources available to the operating areas.

The ability to provide management information on resource utilisation and control.

HYDROGRAPHIC DEVELOPMENT

Work has continued in providing enhanced, or upgraded, hydrographic systems for the ships of the Marine Science Force. Most notable are the provision of new Survey Motor Boats, development of a long term upgrade strategy for the Hydrographic Data Logging and Processing System (HYDLAPS) and plans to place an increased reliance on Differential GPS (DGPS) for position fixing at sea.

The capability requirements for new hydrographic ships and their Marine Science suites have also been developed. This process has had a beneficial effect in drawing together the topical issues of information processing, data quality assessment, survey standards and data formats, and illustrates the need for consistency throughout the chain from data gathering to end product.

A significant review of the Defence requirement for hydrographic data gathering is underway. The Hydrographic Development section has provided much of the data for this review, which is concerned with the balance between force structure requirement for survey capability and the potential benefits of commercial delivery of services.

BRANCH DEVELOPMENT

Activity this year continued to concentrate on the development of the Electronic Chart Display and Information System (ECDIS). A data base of Sydney Harbour was compiled and has been used extensively for demonstration purposes in 'wet' displays and static displays in the Office to many interested parties including Defence, politicians and industry representatives. Data base development of Port Phillip and Port of Melbourne has commenced and is due for completion at the end of 1993. This will coincide with the introduction of DGPS broadcast messages from Melbourne and it is expected that trials will be conducted in Melbourne for ECDIS training and education using the combination of these technologies. This work has been enabled by an additional budget allocation of $0.5M for ECDIS development.

Secondly, work has progressed in conceptualising and developing data base archive systems for survey data and navigation marks. Digital survey data logged into the Office can now be archived and retrieved. The user-interface will be refined and Office procedures are now being developed. A prototype data base schema for the management of navigation marks has been developed and tested and is currently undergoing refinement. It is expected that during the next 12 months, this data base will be operational and will interface to the existing Chart Information System (CIS). The management of this information will provide enhanced capabilities for the Navigation Services element as well as provide a digital base for chart compilation.

Branch development staff have been active within the International Hydrographic Organisation ECDIS arena through participation in data base development of the standard SP57. The Hydrographer has supported the continued development of the ECDIS Colours and Symbols Presentation Library which should be adopted as an ECDIS display standard in the future.

COMPUTER SERVICES

The Chart Information System (CIS) became operational in the Chart Maintenance and Notices to Mariners areas in October 1992 and April 1993 respectively, with the Chart Distribution area due to come on-line in August 1993. This system assists in the management of paper chart production.

The element participated in the Navy Information System Working Group.

CORPORATE DEVELOPMENT

The main thrusts throughout the year were to implement fully the Defence Financial Management Information System throughout the Component, to commence an orderly component-wide personal development profile and plan, to facilitate the introduction of the Naval Quality Management philosophy, take up the devolved personnel functions, and to facilitate the Hydrographic Office relocation to Wollongong.

Additionally, considerable activity has occurred in respect of tracing infringements of Commonwealth copyright and the unauthorised use of hydrographic and chart data and a number of actions are under consideration. The commercial development initiatives planned for some time have not progressed to a business plan level as the available position has not been fully staffed due to higher priorities prevailing.

Efforts have continued to source additional funds for the Hydrographic Service to allow it to respond to new responsibilities for digital data. At year's end the Secretary for the Department of Defence agreed to a joint review of this requirement with the Australian Maritime Safety Authority.

NATIONAL AND INTERNATIONAL AFFAIRS

Hydrographic Office personnel participated in the activities of the following national bodies during the year:

- Inter-Governmental Committee on Surveying and Mapping;
- Maritime Service Advisory Committee - Navigation Safety;
- Permanent Committee on Tides and Mean Sea Level (PCTMSL);
- Steering Committee for the National Tidal Facility (SCNTF);
- Co-ordinating Committee of Commonwealth Marine Science Agencies (HOMA); and
- Commonwealth Spatial Data Committee (CSDC).

During the year stronger links were forged with the Australian Maritime Safety Authority, in recognition of the fact that the introduction of new integrated navigation systems will be a major requirement for maritime safety in the future.

The year also saw a greatly increased awareness by national bodies of the value of maritime safety services in the protection of the marine environment. As a result there has been significant interaction with Federal agencies, particularly the Great Barrier Reef Marine Park Authority and Australian National Antarctic Research Expeditions.

During the year, CDRE Leech actively pursued the issue of national accreditation of hydrographic surveyors. Its current status is that the Institution of Surveyors, Australia (ISA) has given approval in-principle for the formation of a Hydrographic Commission within a Division of the ISA.

CDRE Leech attended the 5 Nations Mapping, Charts and Geodesy Meeting in Hawaii in May 1993.

Mr K.G. Burrows (Director, Co-ordination & Development) attended various IHO Committee and Working Group (WG) meetings held at Monaco in November 1992. He also participated in the deliberations of the Preliminary Meeting of the IHO Permanent WG on Co-operation in Antarctica, and represented Australia at the First Meeting of the Special Committee on Worldwide Electronic Navigational Chart Database, held at Hamburg on 16-18 February 1993.

On 11-14 January 1993, Mr Ian Halls (Manager, Branch Development) attended the Committee on ECDIS (COE) Database WG Meeting/Workshop at Monaco.

In April 1993, Mr R Furness (Manager, Corporate Services) attended the COE WG on Colours & Symbols Meeting at Hamburg. Following this, he attended the IMO/IHO Harmonising Group on ECDIS and the International Electrotechnical Commission (IEC) TC 80/WG7 meetings which were held in Monaco. He also attended the 16th International Cartographic Conference in Koln, Germany.

The Indonesian Hydrographer, First Admiral Ahmad P Muhamad, visited the RAN Hydrographic Office on 21 May 1993 and discussed hydrographic matters of mutual interest with the Hydrographer, RAN.

ASSESSMENT AGAINST PERFORMANCE INDICATORS

The major development task is ECDIS, which is successfully being progressively implemented.

All international commitments affecting the national role of providing maritime geographic and environmental information were met during the period.

Planning and project tasks were performed with minimal impact on operational areas.

Management information was provided satisfactorily in accordance with component objectives for resource management.

ANNEXES

Statement of Income and Expenditure

Expenditure

		$M
Executive		0.139
Hydrographic Survey		
Operations and Surveying [1]	6.182	
MSF Vessels [2]	20.613	26.795
Navigation Services		3.640
Oceanographic Data Acquisition		0.550
Environmental Services		3.016
Co-ordination and Development [3]		3.899
Total:		38.039 [4]

Income

Net Sales Revenue	1.392
Department of Defence Appropriation	36.647
Total:	38.039

Notes:

1. Includes LADS Unit costs since becoming operational on 22 Feb 93.
2. Includes full vessel operating and crew salary costs funded outside Component 215000.
3. Includes central facilities allocation of $0.149M.
4. Includes all civilian and Service salary expenses for Component 215000.

Chart Revenue

DISTRIBUTION OF CHARTS AND ASSOCIATED PUBLICATIONS

		1990-91	1991-92	**1992-93**
Australian	Issued	20,961	29,075	**25,739**
	Sold	100,429	95,921	**113,275**
British Admiralty	Issued	17,493	16,144	**12,554**
	Sold	6,260	5,327	**5,332**
New Zealand	Issued	1,564	1,627	**1,748**
	Sold	295	238	**407**
Canadian	Issued	61	26	**43**
	Sold	68	69	**54**
	Total:	147,131	148,427	**159,152**

VALUE OF CHARTS AND ASSOCIATED PUBLICATIONS SOLD

(Exclusive of Sales Tax)

	1990-91	1991-92	**1992-93**
Australian	$853,773	$947,075	**$1,255,705**
British Admiralty	$136,295	$116,857	**$130,070**
New Zealand	$3,424	$3,174	**$5,490**
Canadian	$449	$455	**$356**
Total:	$993,941	$1,067,561	**$1,391,621**

REVENUE SUMMARY

	1990-91	1991-92	**1992-93**
Net Sales	$993,941	$1,067,561	**$1,391,621**
Sales Tax	$66,659	$69,189	**$81,283**
Freight & Sundries	$9,831	$43	**$118**
Total Revenue	$1,070,431	$1,136,793	**$1,473,022**
Value of Issued Stock	$530,037	$741,110	**$665,097**

Note: In addition, the British Hydrographic Office sells approximately A$30,000 worth of AUS series charts each year.

Surveys Undertaken (July 1992 - June 1993)

Unit	Instruction	Location	Area Sounded (nm^2)
HMAS MORESBY	HI 178	Stevens Island to Howard Island and Cadell Strait	559
	HI 188	Elcho Island to Northeast Crocodile Island	854
	HI 191	Charles Point Patches and Lorna Shoal to Fog Bay (SMB)	36
HMAS FLINDERS	HI 181	Flora Reef to Dianne Bank	1263
	HI 182	Saumerez Reef	989
	HI 183	Gulf of Papua	581
HMA Ships MERMAID and PALUMA	HI 179	Castlereagh Bay	219
	HI 186	Flinders Passage	216
	HI 192	Bunker Reef to Fairway Channel (LADS benchmark areas)	8
HMA Ships SHEPPARTON and BENALLA	HI 172	Halifax Bay	102
	HI 180	Dunk Island - LADS Support	80
	HI 184	Stevens Island to Dugong Island	483
LADS	HI 185	Flinders Passage	1449
HODSU	N/A	Beachcomber 92	30
	HI 187	Swallows Landing	1
	HI 189	Approaches to Casey	110
	N/A	Beachcomber 93	15
		Total:	**6995**

Chart Production And Maintenance

	1990-91	1991-92	**1992-93**
New Chart Production			
New chart published	7	13	**6**
New editions published	4	21	**11**
New charts/diagrams for RAN use	12	8	**9**
Miscellaneous charts	7	1	**1**
Chart Maintenance			
Modified reproductions of BA charts	0	30	**4**
Modified facsimiles of BA charts	0	1	**0**
Notice to Mariners block corrections	38	25	**22**
Revisions by reprinting	175	175	**147**
Revisions by screen printing	123	212	**110**
Miscellaneous graphics	56	26	**41**

Description Of New Charts Published

New Charts

Aus 601 — Approaches to Casey (Australian Antarctic Territory) 1:50 000.
Published 4 Dec 92.
Limits: 66° 09'00"S - 66° 17'00"S / 110° 28'00"E - 110° 45'00"E

This chart in metric format replaces former chart Aus 601 of imperial units published 30 Nov 62. The new digital version is based on modern datums, vertical Lowest Astronomical Tide and horizontal World Geodetic System (1984), the latter enabling satellite navigation derived positions to be plotted directly onto the chart. The approaches to Australia's Antarctic Base was surveyed by the RAN in 1992. Included on the chart is a large scale plan (1:12 500) of Newcomb Bay.

Aus 502 — Cape Blackwood to Kerema Bay (Papua New Guinea).
Published 4 Dec 92.
Limits: 7° 28'00"S - 8° 21'15"S / 144° 28'00"E - 145° 52'28"E

A new metric unit medium scale, 1:150 000, coastal navigation chart situated in the northern area of the Gulf of Papua, based on modern datums, LAT and WGS (84). The chart provides access to the Deception Bay oil exploration region, which was surveyed by the RAN 1987-91 and supported by private company surveys. A large scale plan 1:37 500, of Kerema Bay, surveyed 1991, is also included.

Aus 207 — Approaches to Newcastle (NSW). 1:25 000
Published 12 Apr 93.
Limits: 32° 50'23"S - 32° 59'13.2"S / 151° 40'54"E - 151° 57'28.2"E

Replacement of chart Aus 207 published 10 May 72. Geographic limits have been adjusted and chart reschemed in landscape format to include the outer pilot boarding station. Modern datums have been applied, LAT and WGS (84).

Aus 4622 (Int 622) — Admiralty Islands to Solomon Islands, 1:1 500 000.
Published 16 Apr 93.
Limits: 1° 02'30"N - 8° 30'00"S / 141° 54'20"E - 158° 00'00"E

A medium scale international chart designed for route planning, passage/landfall use. The chart provides far greater accuracy and completeness of islands and reef positions surrounding Papua New Guinea, New Ireland, New Britain and the Solomon Islands, than previously charted at an equivalent scale.

Aus 749 Shark Bay, SW sheet (Western Australia), 1:150 000.
Published 21 May 93.
Limits: 25° 23'51"S - 26° 55'30"S /
112° 42'07.5"E - 113° 41'30"E

A coastal navigation chart, the first of three at this scale covering the waters of Shark Bay. Limits of Marine and Estuarine Protected Areas throughout Denham Sound are depicted. Included is a plan of Slope Island berthing facilities at scale 1:10 000.

Aus 603 Approaches to Commonwealth Bay (Antarctica)
Published 25 Jun 93.
Limits: 66° 50'06"S - 67° 04'00"S /
142° 20'00"E - 142° 42'30"E

A large scale (1:25 000) chart designed to assist coastal location identification for tourist vessels. Although there is barely sufficient bathymetry and topographic details available to ensure safe navigation, the chart notwithstanding, provides access to this area of Antarctica not previously charted to this degree. Also included is a plan of Boat Harbour at scale 1:5 000.

New Editions of Charts

Aus 220 Plans in NSW North Coast, 8 Oct 92.

The Clarence River Entrance plan was reschemed to provide coverage up river to the Pacific Highway bridge. Scale was altered from 1:12 500 to 1:25 000. General updating action was applied to the chart.

Aus 236 Moreton Bay, 1:75 000, 4 Dec 92.

This chart was subject to a vertical datum adjustment (LAT) to the many surveys produced by the Queensland Department of Transport. Although production time was extensive the vast number of completed surveys and navigation aids throughout Moreton Bay made this a complex digital product.

Aus 235 Approaches to Moreton Bay, 1:75 000, 4 Dec 92.

Produced in conjunction with Aus 236 this digital version, based on Queensland Department of Transport surveys, was also adjusted to Lowest Astronomical Tide datum.

Aus 200 Port Jackson, 1:20 000, 4 Dec 92.

A digital edition based on surveys by the Maritime Services Board NSW to 1992, adjusted to Lowest Astronomical Tide datum.

Aus 208 Newcastle Harbour, 1:7 500, 30 Jun 93.

New edition action was taken to update navigation aids throughout the harbour and adjust the chart graticule to World Geodetic System (1984) horizontal datum.

Aus 116 Plans in Western Australia, West and South Coasts, 25 Jun 93.

Horizontal datum has been adjusted to World Geodetic Datum (1984) and the chart includes modern surveys to 1992 by the WA Marine and Harbours.

Aus 244 Plans in Port of Gladstone, 20 Sep 92.

This chart was reschemed to amalgamate the plans of Clinton Coal Loader Wharf and Auckland Point to Barney Point in one plan at scale 1:10 000. The chart now provides continuous navigation between Barney Point and Targinie Channel.

Aus 115 Approaches to Bunbury, 1:50 000, 20 Nov 92.

General revision to include surveys by WA Marine and Harbours to 1990.

New edition action was also applied to the following three charts in order to maintain consistency with British Admiralty versions of the same charts. The process involved the inclusion of new ocean sounding details supported by amended depth contour interpolation, abridging of specific light descriptions and minor nomenclature alterations.

Aus 4070 (Int 70) Indian Ocean, Southern Portion, 1:10 000 000, January 1993.

Aus 4071 (Int 71) Indian Ocean, Northern Portion, 1:10 000 000, November 1992.

Aust 4710 Cape Leeuwin to Southeast Indian Rise, 1:3 500 000, December 1992.

Oceanographic Products and Services

Title	Requestor	Area of Interest	Time Period
Solomon Island Wharf Development	Clearance Divers	Solomon Is	Mar 93
Planning Brief	HS817 Squadron		Mar 93
Exercise Lungfish	MHQ		Dec 92
Low Frequency Sonar Trial	DSTO		Mar 93
Environmental Summary	LADS	Flinders Passage	Mar 93
Environmental Summary	LADS	Spencer Gulf	May 93
Operation Solace	MHQ	South Indian Ocean	Mar 93
Exercise Tasmanex	MHQ	Tasman Sea	Mar 93
Environmental Summary	LADS	Bunker Reef	Sep 93
Environmental Summary	National Resource Information Centre	Shoalwater Bay	1993
Exercise Kakadu	MHQ		May 93
Exercise Starfish	MHQ	S.E. Asia	Sep 93
Exercise New Horizon 7	MHQ		Aug 93
Exercise Lungfish	MHQ		Oct 93
Environmental Summary	LADS	Flinders Passage	Dec 93
Environmental Summary	LADS	Capricorn Group	May 94

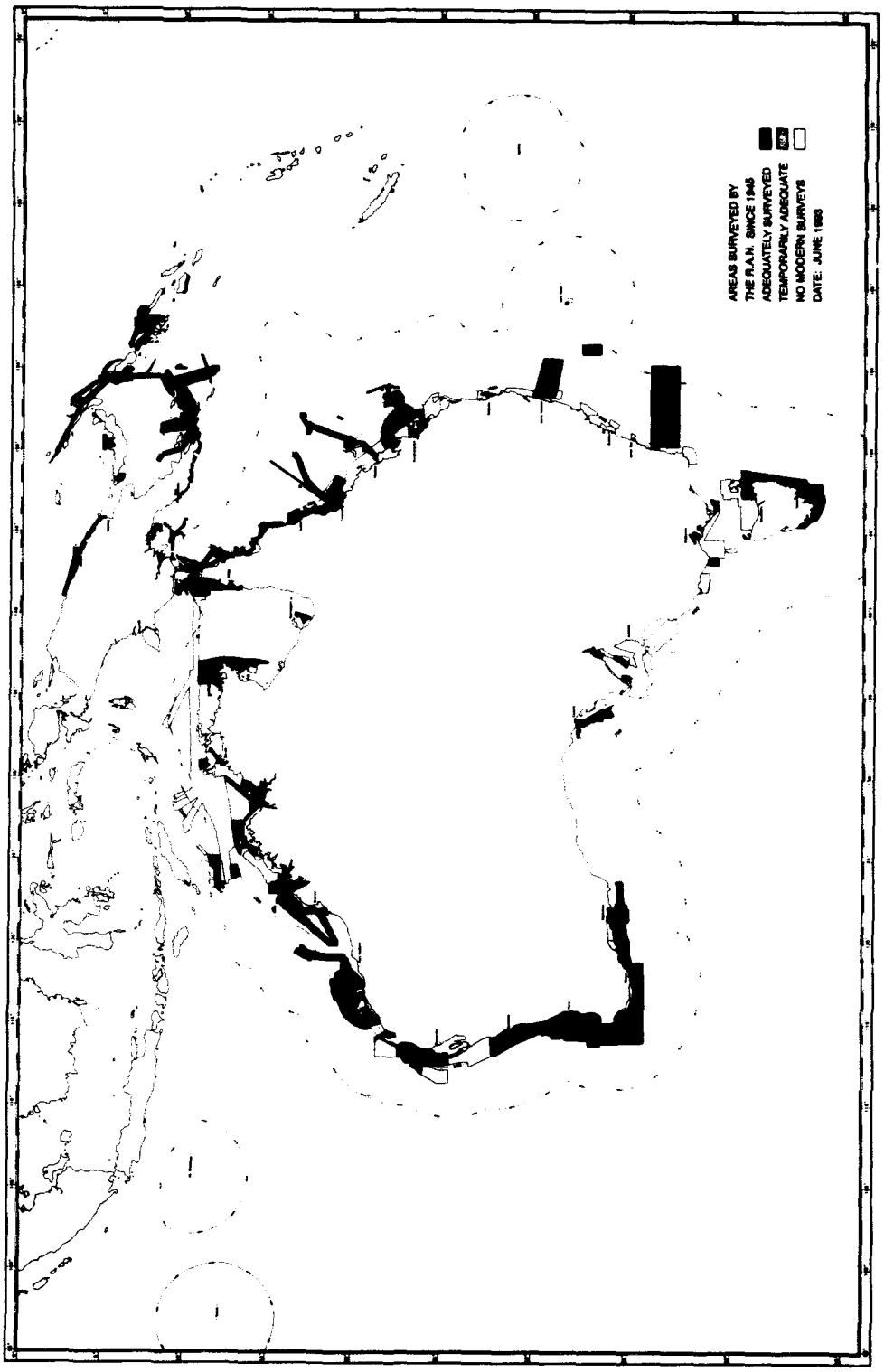


Figure 2. Survey Coverage

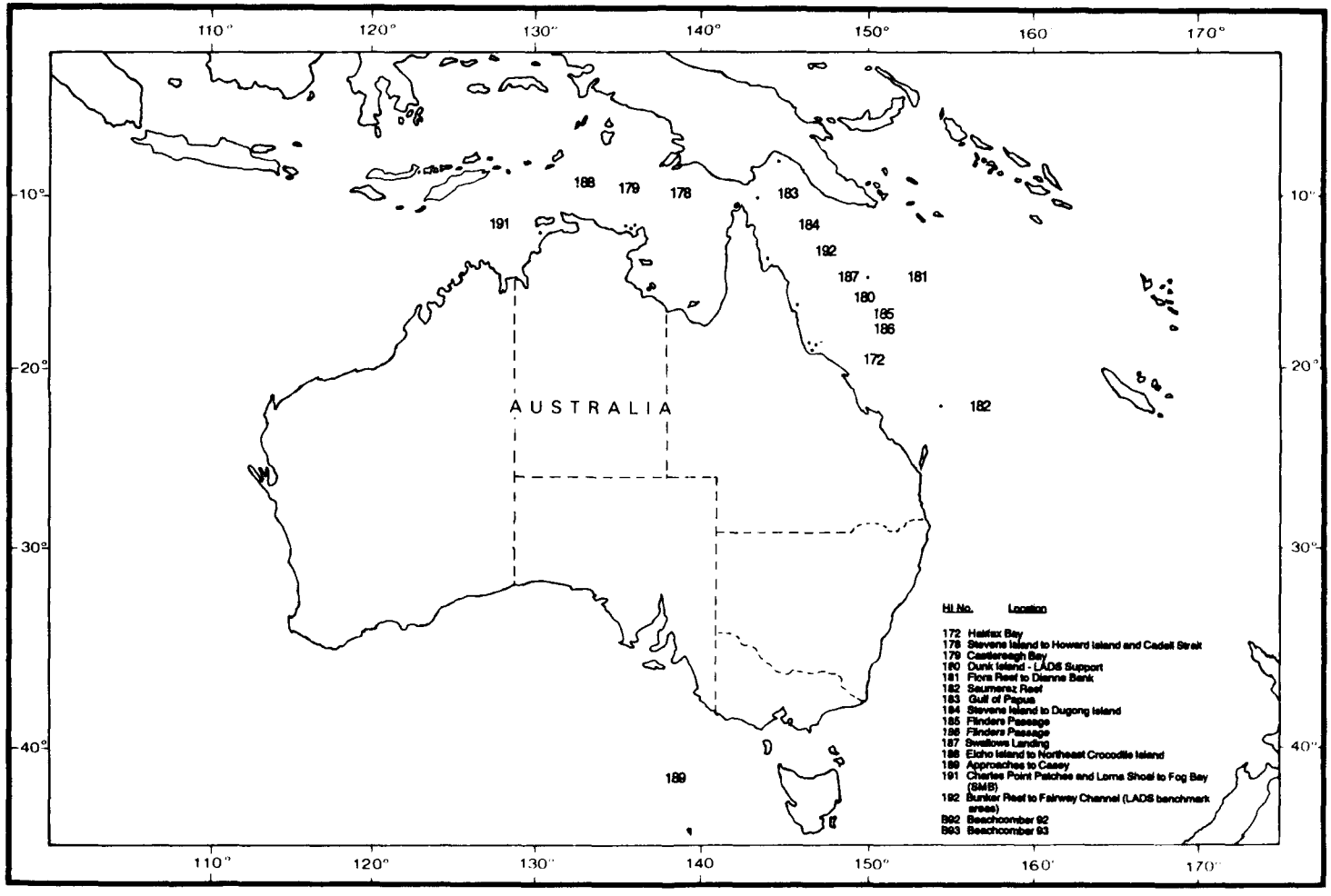


Figure 3. Survey Undertaken 1992 - 1993

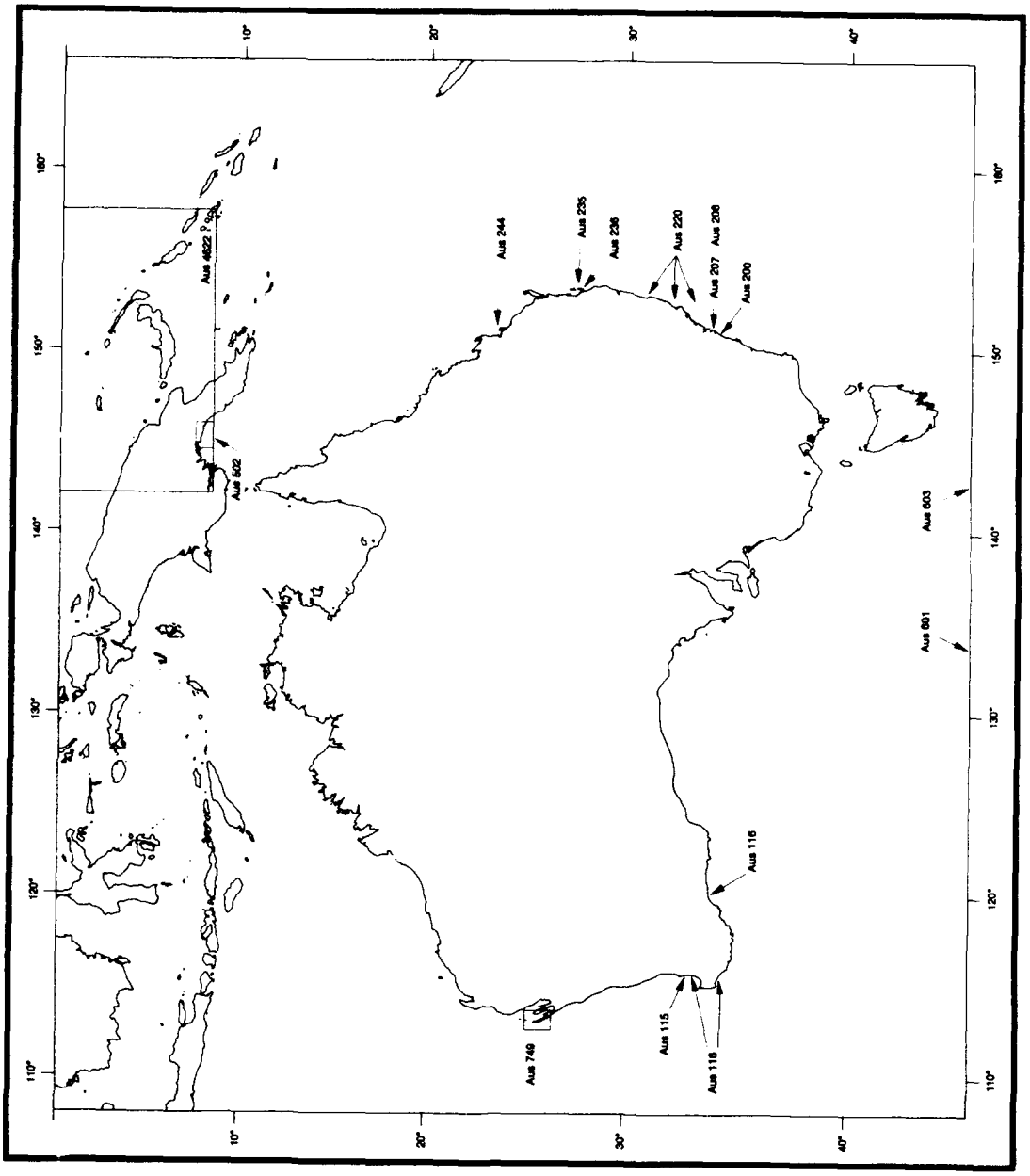
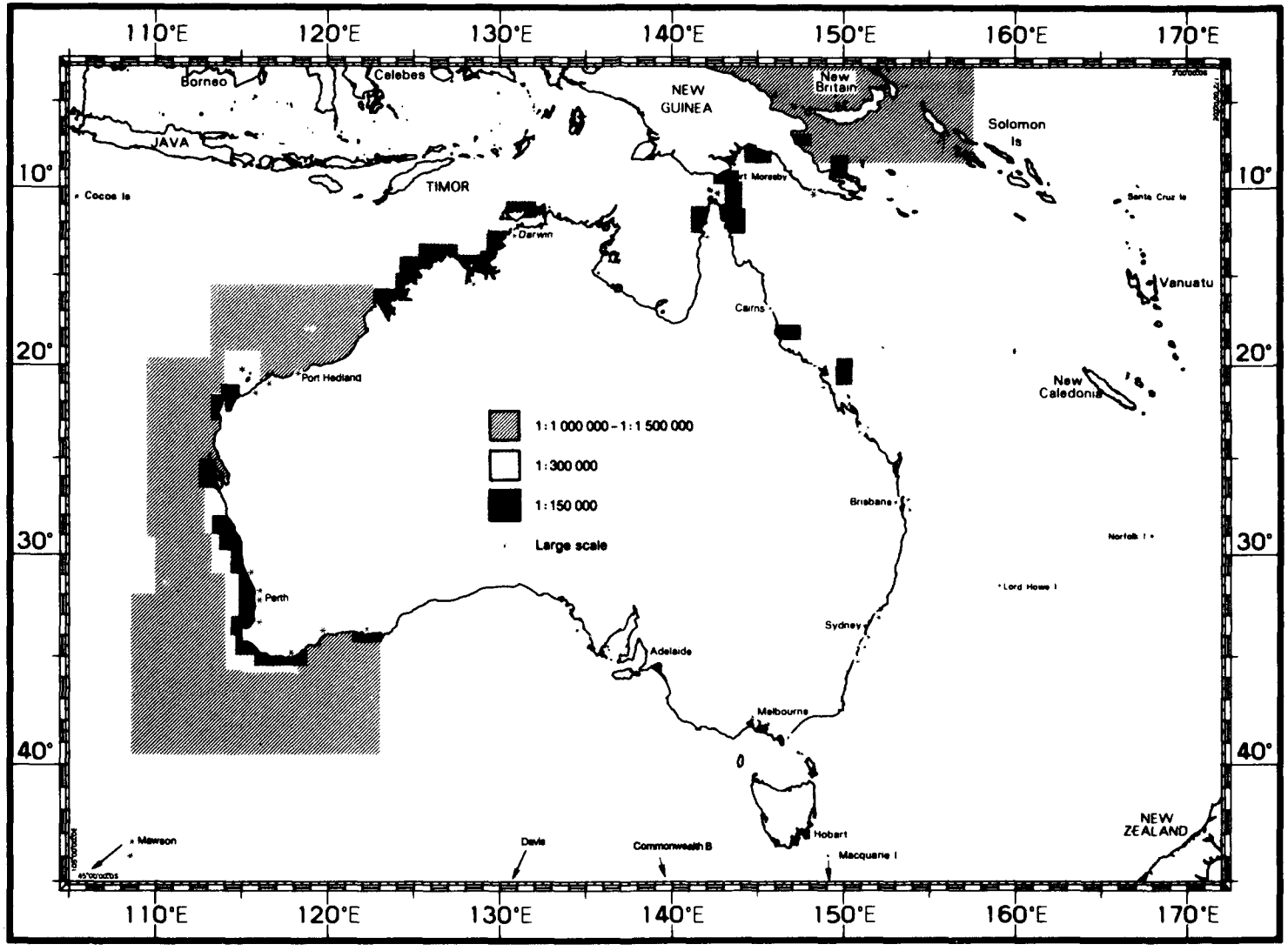


Figure 4. Charts Published 1992 - 1993


110°E
120°E
130°E
140°E
150°E
160°E
170°E
10°
20°
30°
40°
Borneo
Celebes
NEW GUINEA
New Britain
Solomon Is
JAVA
TIMOR
Cocos Is
Darwin
Port Moresby
Santa Cruz Is
Vanuatu
Cairns
Port Hedland
New Caledonia
1:1 000 000 - 1:1 500 000
1:300 000
1:150 000
Large scale
Brisbane
Norfolk I
Lord Howe I
Perth
Sydney
Adelaide
Melbourne
Hobart
Macquarie I
NEW ZEALAND
Mawson
Davis
Commonwealth B

Category/Scale	Published Imperial	Published Metric	Total Published	Total Planned
Small scale 1:150 000 to 1:1 000 000				
1:150 000 Aus, PNG	27	59	86	195
1:300 000 Aus, PNG	48	29	77	99
1:1 000 000 Aus, PNG, Antarctica	13	3	16	34
1:500 000 and smaller Aus, PNG, Antarctica	6	3	9	21
Large scale 1:5 000 to 1:100 000				
Aus	22	94	116	202
PNG	27	2	29	40
Antarctica	0	4	4	4
Territories & Reefs	4	4	8	16
International charts				
1:1 500 000	0	2	2	20
1:3 500 000	0	6	6	6
1:10 000 000	0	3	3	3
Other Charts				
Recreational Charts PC (Pleasure Craft) series	2	5	7	12
Y(Yachting) series	1	3	4	4
RAN Fleet Series	11	11	22	40
Diagrams	4	15	29	40
Total:	175	243	418	736

Notices to Mariners key indicators for the 1992-93 period were:

	1990-91	1991-92	**1992-93**
Notices to Mariners issued	699	748	**685**
Block corrections for charts	38	25	**22**
Notes for charts	21	78	**83**
Reproduction of BA blocks	1	5	**0**
Reproduction of BA notes	3	7	**24**
Reproduction of NZ blocks	1	0	**0**
Reproduction of NZ notes	13	10	**11**
Hydrographic notes from HMA Ships	79	71	**115**
Hydrographic notes from other sources	45	33	**35**

Vessels (excluding MSF ships) rendering three or more Hydrographic Notes during the year were:

HMAS Melbourne	34
HMAS Cessnock	6
HMAS Ipswich	5
HMAS Fremantle	4
Jardine Shipping	3
MV Bass Reefer	3
MV Boral Gas	3
Vanuatu Hydrographic Unit	3

Acknowledgment is made to the following organisations which supplied data to the Hydrographic office on an exchange or voluntary basis:

NEW SOUTH WALES	Maritime Services Board Telecom Australia Wilton & Bell & Partners
NORTHERN TERRITORY	AUSLIG Thiess Contractors Pty Ltd
QUEENSLAND	Colefax Clayton Smith Pty Ltd *Department of Primary Industry* DOT-Queensland Marine & Harbours Division North Queensland Electricity Board Port of Brisbane Authority
SOUTH AUSTRALIA	BHP Ltd Department of Harbours & Marine PJ Leedham & Associates Savant Pty Ltd
TASMANIA	Australian Maritime College [Search Ltd] Burnie Port Authority Marine Board of Hobart *Port of Devonport Authority*
VICTORIA	Place & Names Company Port of Geelong Authority Port of Melbourne Authority
WESTERN AUSTRALIA	Australian Geological Survey Office Department of Lands Administration Department of Marine & Harbours Fremantle Sailing Club Western Australian Petroleum Pty Ltd
ANTARCTICA	AUSLIG
NORFOLK ISLAND	AUSLIG
PAPUA NEW GUINEA	Papua New Guinea Harbours Board National Mapping Bureau

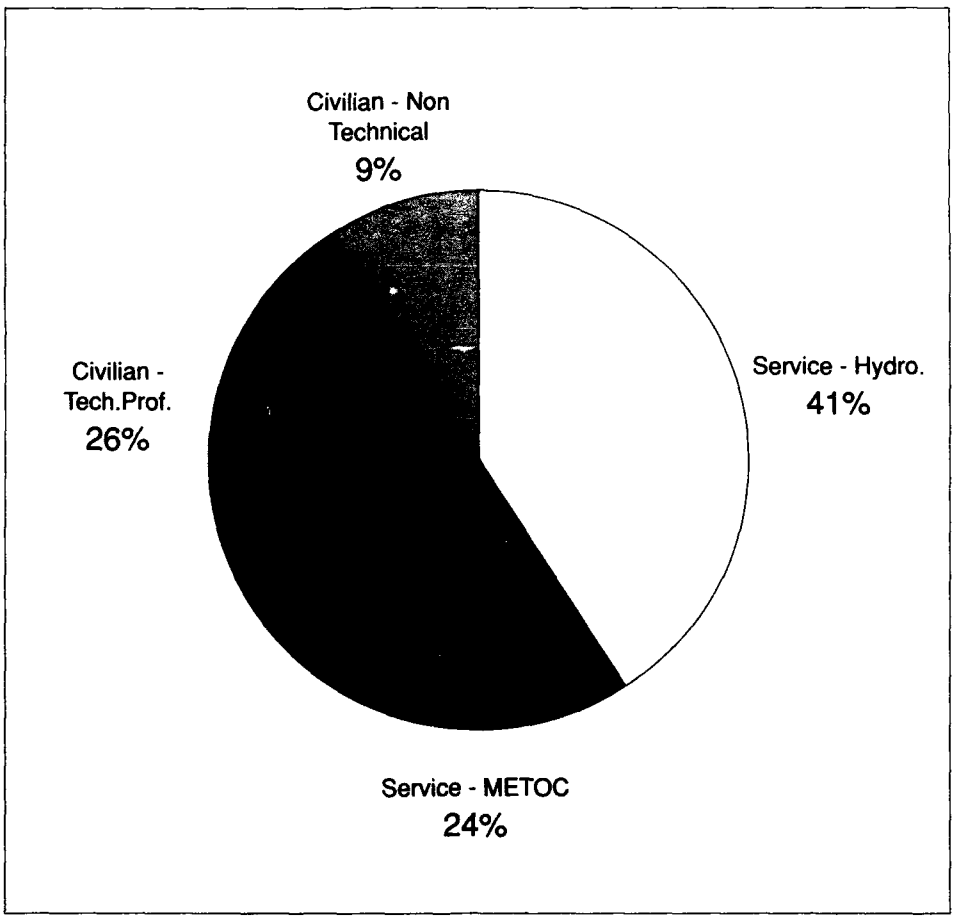
Oceanographic Data Received by AODC (July 1992 - June 1993)

Institution	Data Type	No. of Observations or Stations
Australian Sources		
R.A.N	Expendable Bathythermograph (XBT)	1241
R.A.N	Secchi disc logsheet	429
R.A.N	Bottom sample logsheet	266
R.A.N	Bioluminescence logsheet	291
R.A.N.	Current Meter	8
CSIRO Division of Oceanography	Expendable Bathythermograph (XBT)	207
CSIRO Division of Oceanography	Conductivity Temperature Depth (CTD)	4947
University of Sydney Ocean Sciences Institute	Bottom Type Database	~5000
International Sources		
World Data Centre B, Russia	Mechanical Bathythermograph (MBT)	150,000
Japan Oceanographic Data Centre	Expendable Bathythermograph (XBT)	849
Japan Oceanographic Data Centre	Conductivity Temperature Depth (CTD)	2935
Japan Oceanographic Data Centre	Surface Current	3180
Royal New Zealand Navy	Expendable Bathythermograph (XBT)	131
NOAA Marine Geophysical Data Centre	Navigation, Bathymetry, Magnetics, Gravity	33.2 *million* records from 3400 cruises

Hydrographic Service Staffing Levels

Staff Category		FY 91/92	FY 92/93
Service - Hydrographic Survey Officers and Sailors		114	**119**
Service - Meteorological/Oceanographic Officers and Sailors		75	**73**
Civilian - Professional/Technical		86	**78**
Civilian - Non Technical		30	**28**
	Total:	305	**298**

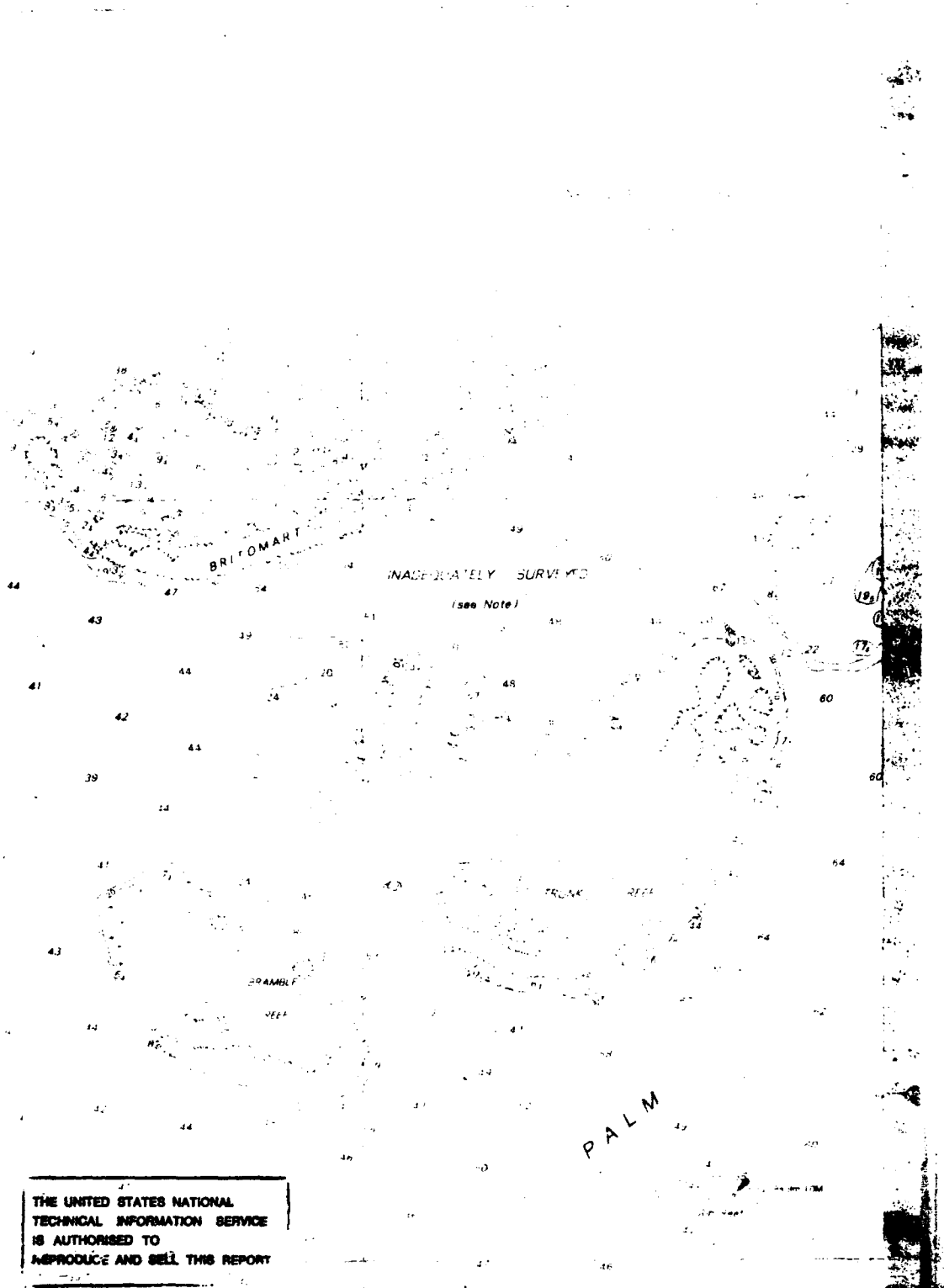
Staffing Structure FY 1992/93



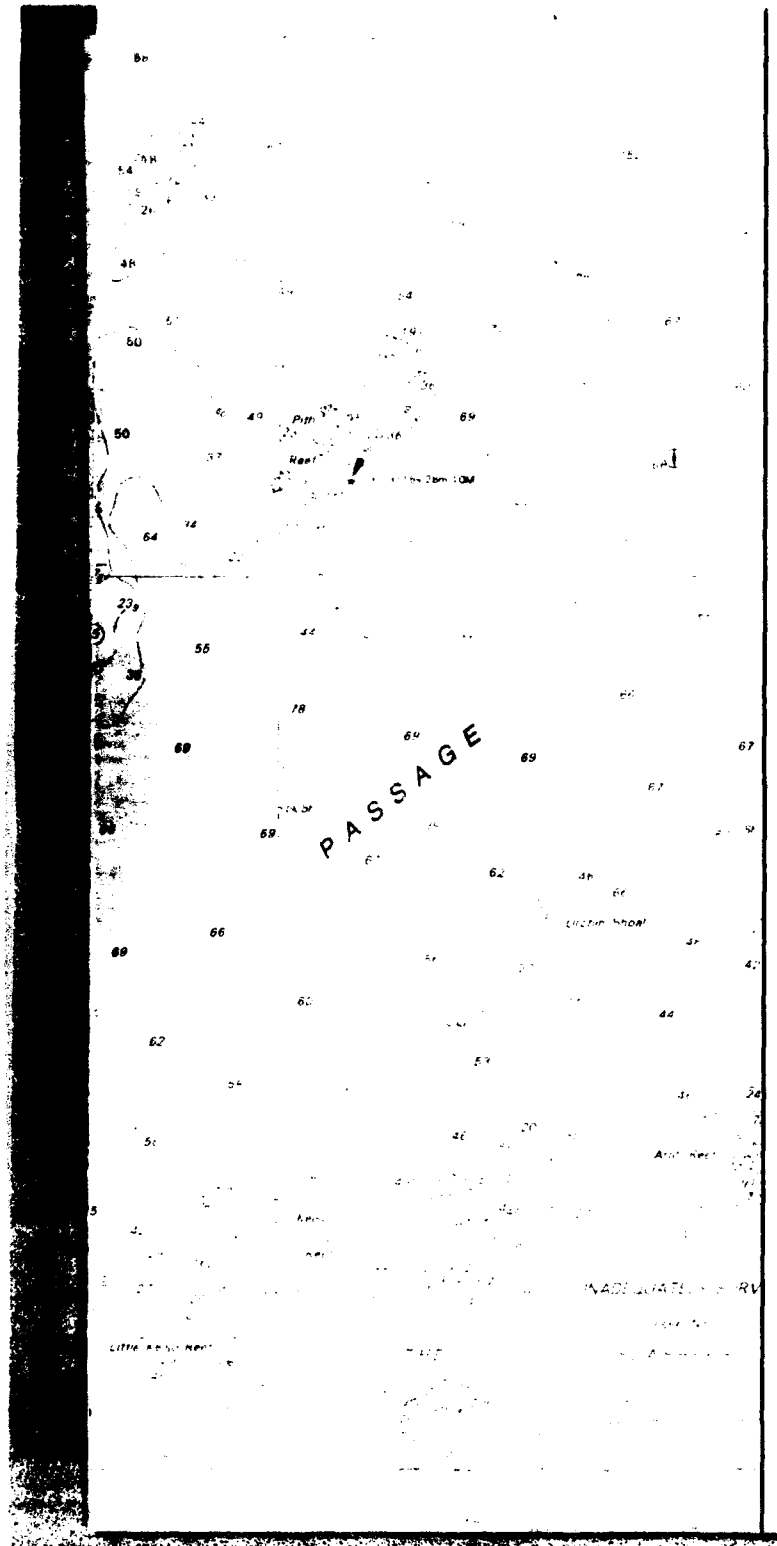
Hydrographic Service RAN—Key Staff And Addresses

Hydrographer	Commodore J.W. Leech, RAN
Operations	
Director Hydrographic Operations	Captain R.J. Willis, RAN
Head Operations and Surveying	Commander G.J. Geraghty, RAN
Head Nautical Charting	Mr B.C. Leonard
Head Navigation Services	Mr M.A. Bolger
Manager Information Services	Mr I.P. Kennedy
Manager Chart Distribution	Mr N.J. Gillin
Co-ordination and Development	
Director Co-ordination and Development	Mr K.G. Burrows, OAM
Manager Corporate Development	Mr R.A. Furness
Manager Branch Development	Mr I.W. Halls
Manager Hydrographic Development	Commander R.E. Ward, RAN
Head Computing Services	Mr J. Herbert (Acting)
Manager National and International Affairs	Mr J. Randhawa
Manager Financial Resources	Mr K. Reid
Manager Human Resources	Mr J. O'Brien
Canberra	
Hydrographic Projects Officer	Lieutenant Commander D.H. James, RAN
Oceanography and Meteorology (MHQ Annex)	
Director Oceanography and Meteorology	Commander D.J. Knight, RAN
Head Science and Oceanography	Mr B.J. Searle
Commander Naval Weather and Oceanographic Centre (Nowra)	Commander C.A. Low, RAN

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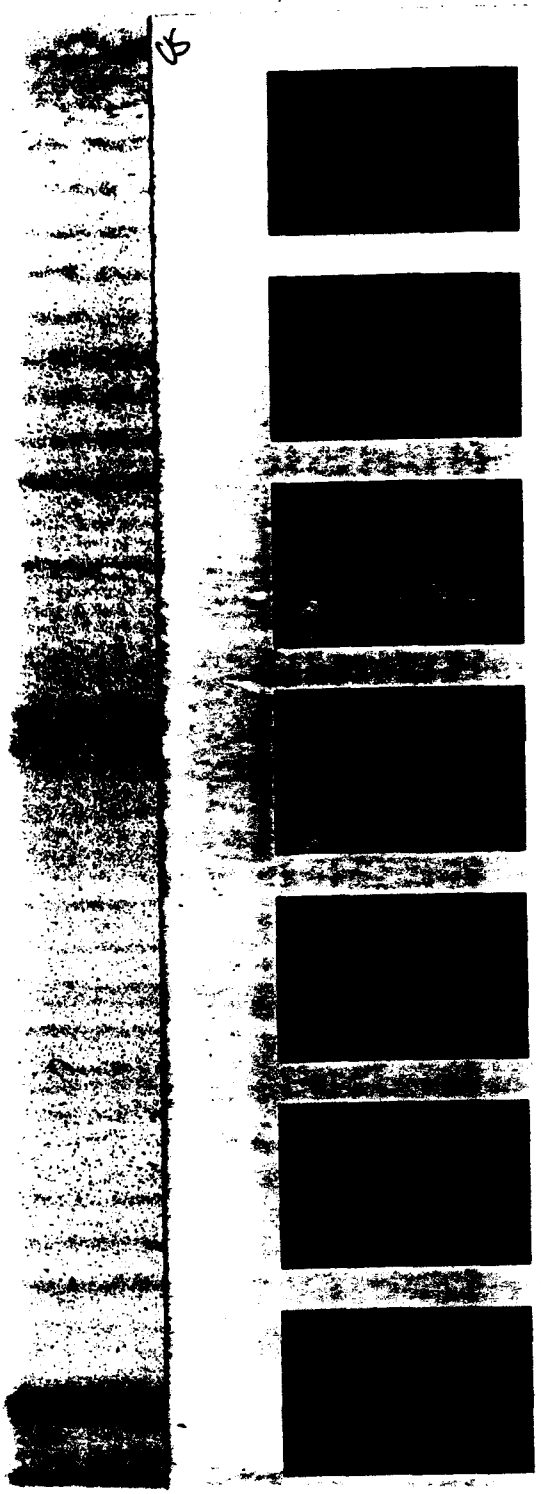
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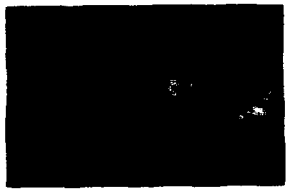
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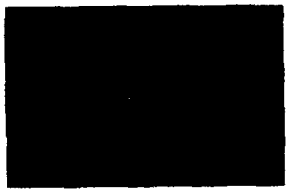
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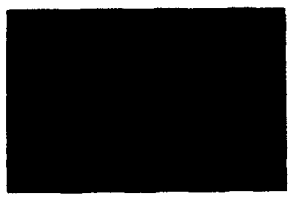












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